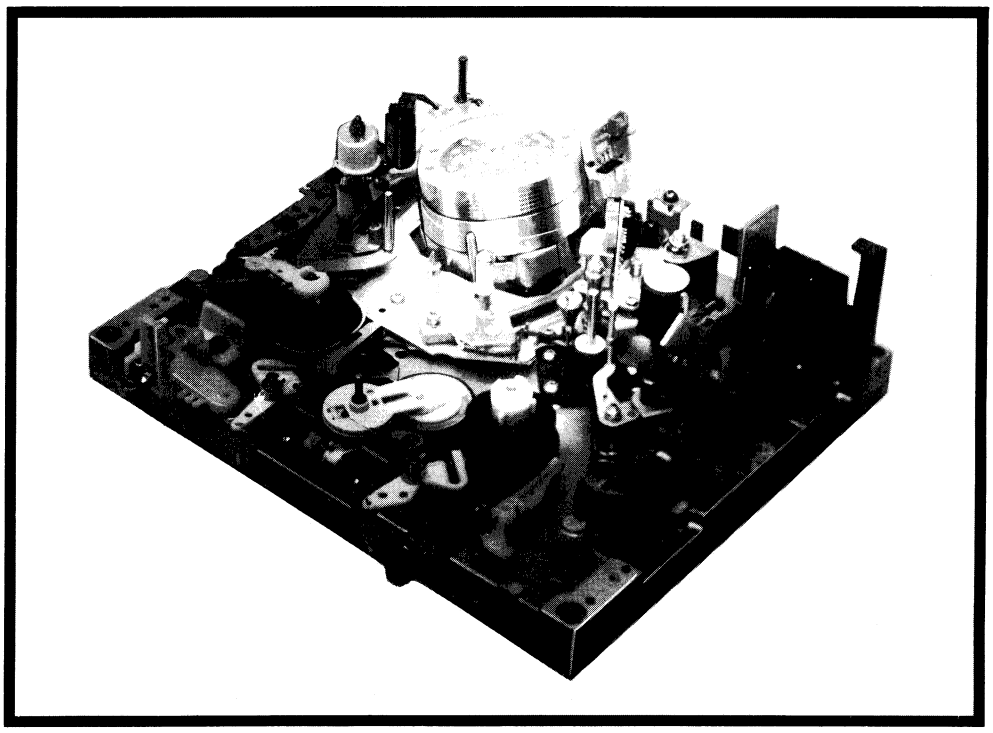
ORDER NO. VRD-8310-490

Service Manual

VHS Video Cassette Recorder
Mechanical chassis

No. D-1

Mechanical Adjustment Procedures



IMPORTANT
The D-1 mechanical chassis is built in the several NATIONAL/ PANASONIC VHS Video Cassette Recorders.
Thus, properly file this service manual with the service manuals of the relative video cassette recorders.
(Main applicable models: NV-850, NV-370)

National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

INTRODUCTION

This Service Manual describes the mechanical adjustment procedures needed for properly adjusting the D-1 Mechanical Chassis used for the NATIONAL/PANASONIC VHS Video Tape Recorders. Mechanical adjustment procedures needed for these VHS VTRs incorporating the D-1 Mechanical Chassis are described in the Mechanical Adjustment Section of the Service Manuals related to respective VTR models.

CONTENTS

1. MECHANICAL ADJUSTMENT PROCEDURES 1

1-1. PRESSING FORCE CONFIRMATION OF PRESSURE ROLLER 1

1-2. ADJUSTMENT OF SAFETY SWITCH 1

1-3. POSITION ADJUSTMENT OF TENTION POST 2

1-4. CONFIRMATION OF BRAKE TORQUE 2

1-5. CONFIRMATION OF TAKE-UP TORQUE 3

1-6. ADJUSTMENT OF REVIEW TORQUE 3

1-7. MEASUREMENT AND ADJUSTMENT OF BRCK TENSION ... 4

1-8. HEIGHT ADJUSTMENT OF REEL TABLES 4

1-9. HEIGHT ADJUSTMENT OF TAPE GUIDE POST 5

1-10. HEIGHT ADJUSTMENT OF PULL OUT POST 6

1-11. TAPE INTERCHANGEABILITY ADJUSTMENT 7

1-12. CONFIRMATION/ADJUSTMENT OF A/C HEAD HEIGHT 8

1-13. TILT ADJUSTMENT OF A/C HEAD 8

1-14. AUDIO AZIMUTH ADJUSTMENT 9

1-15. HORIZONTAL POSITION ADJUSTMENT OF A/C HEAD 9

1-16. ADJUSTMENT OF FG HEAD GAP 10

1-17. ADJUSTMENT OF THRUST GAP 10

1-18. ADJUSTMENT OF CAM GEAR AND MODE SELECT SWITCH 11

SERVICING FIXTURES & TOOLS 13

1. MECHANICAL ADJUSTMENT PROCEDURES

1-1. PRESSING FORCE CONFIRMATION OF PRESSURE ROLLER

* Equipment Required:
  Fan-Type Tension Gauge (VFK66)

* Specification: 1600 ± 350g

1. Remove the cassette compartment. Do not disconnect the connection cable from the Front Loading Motor.
2. Manually move the cassette compartment in the direction shown below. When the cassette-up switch is OFF, then manually turn the cassette-in switch ON. Simulate Loading operation for the cassette compartment without inserting the cassette tape.

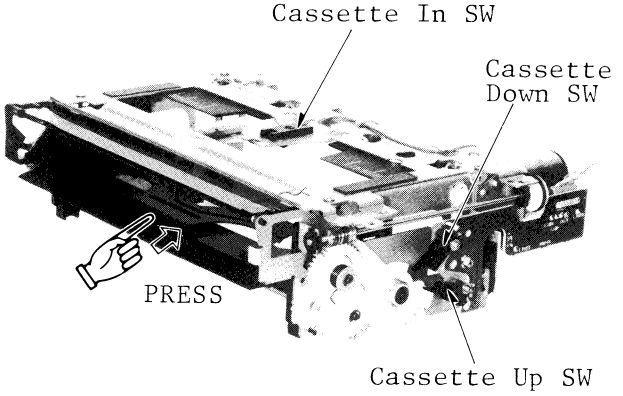


Fig. 1

3. Install a cassette tape onto the reel tables as of the following condition, then press the Playback Key to activate the Playback mode.

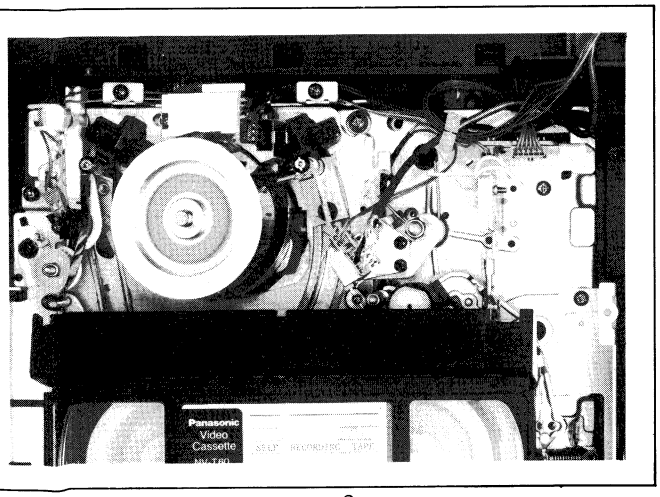


Fig. 2

4. Set Fan-Type Tension Gauge to the direction indicated by the arrow as shown below.

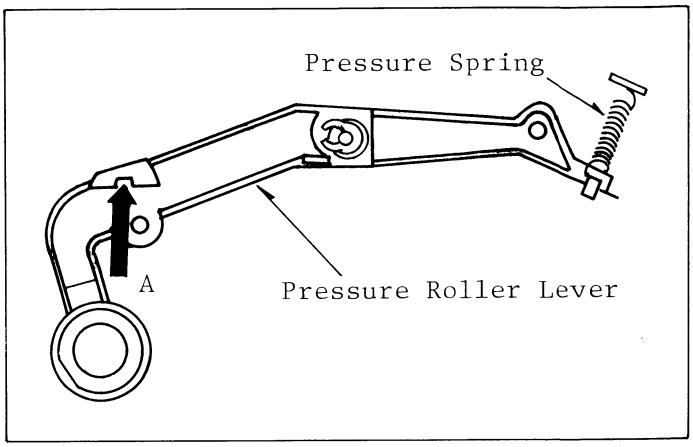


Fig. 3

5. Confirm that reading of the Tension Gauge is 1600 ± 350g at the moment of roller stop.
6. If it is out spec., replace the pressure spring.

1-2. ADJUSTMENT OF SAFETY SWITCH

* Equipment Required:
  Cassette Holder Fixture (VFK0188)

1. Remove the cassette compartment.
2. Slightly loosen the 2 screws (A) and (B), and then place the fixture.

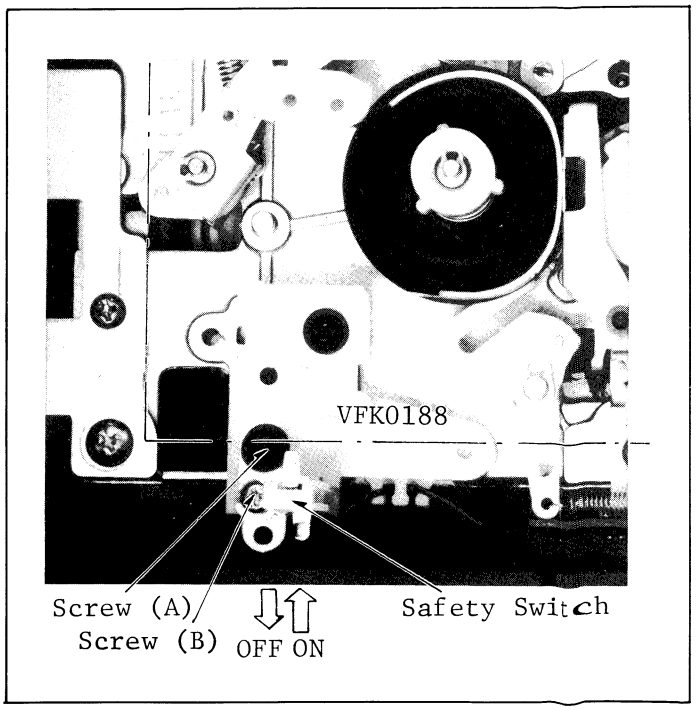


Fig. 4

3. Connect the oscilloscope to safety switch Terminal and set it to DC position.
4. Turn the switch base counter clockwise and then slowly turn it clockwise until the switch turns ON. (Indication of oscilloscope becomes low level from high level.)
5. After the adjustment, confirm that the switch turns on by using a tape with safety tab and off without tab.

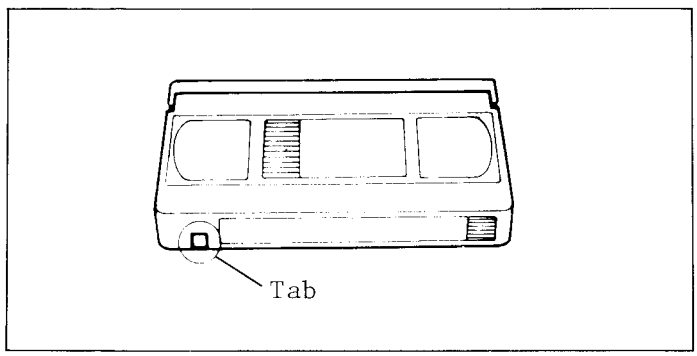


Fig. 5

1-3. POSITION ADJUSTMENT OF TENSION POST

* Equipment Required:
  Tension Post Adjustment Plate (VFK0187)
  Fine Adjustment Screwdriver (VFK0136)

1. Remove the cassette compartment. Do not disconnect the connection cable from the Front Loading Motor.
2. Insert a cassette tape into the cassette compartment, and push the PLAY button for loading.
   As soon as the loading is completed, take out the AC plug.
3. Place the adjustment plate and slightly loosen a screw securing the tension band bracket.
4. Insert the fine adjustment screw driver into the hole and move the tension band bracket in either of direction so the tension post just touches the fixture.
5. After the adjustment, connect the AC plug for unloading.

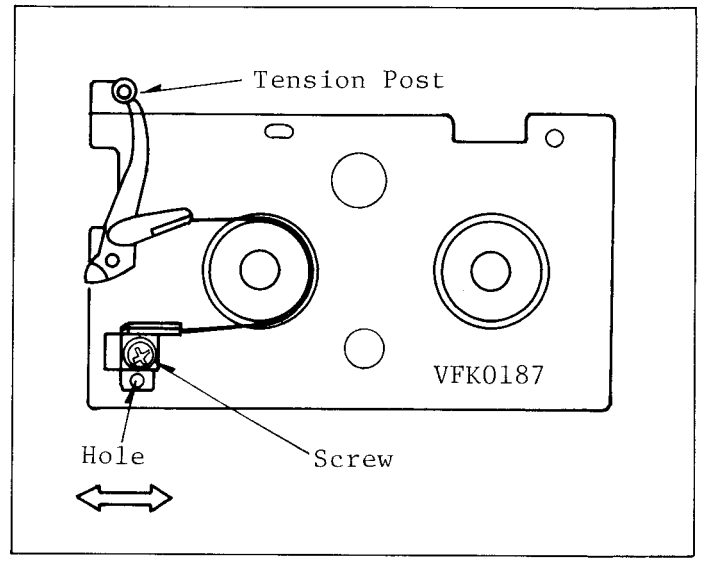
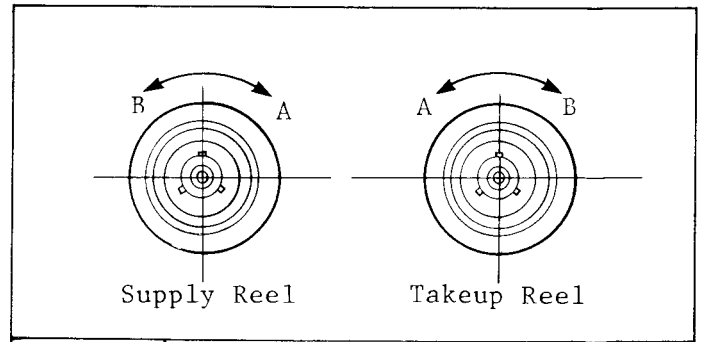


Fig. 6

1-4. CONFIRMATION OF BRAKE TORQUE

* Equipment Required:
  Torque Gauge (VFK0133)
  Adaptor for Gauge (VFK0134)

Spec.



	A	B
Takeup	450 ∿ 800g-cm	70 ∿ 150g-cm
Supply	450 ∿ 800g-cm	70 ∿ 150g-cm

Fig. 7 Spec. of Brake Torque

1. Remove the cassette compartment.
2. Attach the adaptor to the torque gauge and place the deck in STOP mode.
3. Place the torque gauge on the reel table.
   The weight of gauge should be free against the reel table.

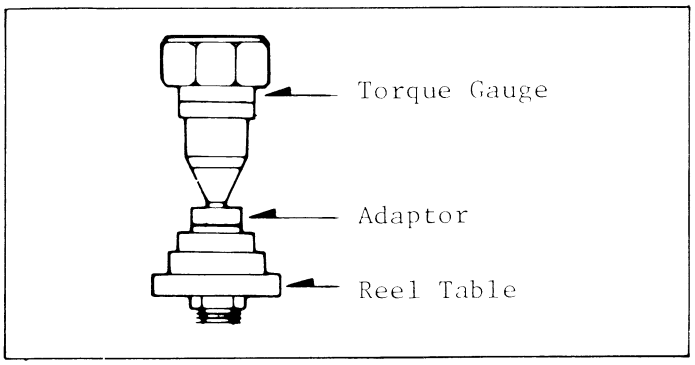


Fig. 8

4. Turn torque gauge in the direction indicated in Fig. 7 until the brake begins slipping.

1-5. CONFIRMATION OF TAKE-UP TORQUE

* Equipment Required:
  Dial Gauge (VFK0133)
  Adaptor for Gauge (VFK0134)

* Specification:
  PLAY mode ..... 105 ∿ 145g-cm
  FF mode ..... more than 400g-cm
  REW mode ..... more than 400g-cm

1. Remove the cassette compartment. Do not disconnect the connection cable from the Front Loading Motor.
2. Insert a cassette tape and attach the adaptor to the torque gauge.
3. Set a torque gauge to the Take-up Reel Table, and then push the PLAY button and read a torque gauge. Also perform for FF mode by pushing the FF button.
4. Set a torque gauge to the supply Reel Table, and push the REW button and read a torque gauge.

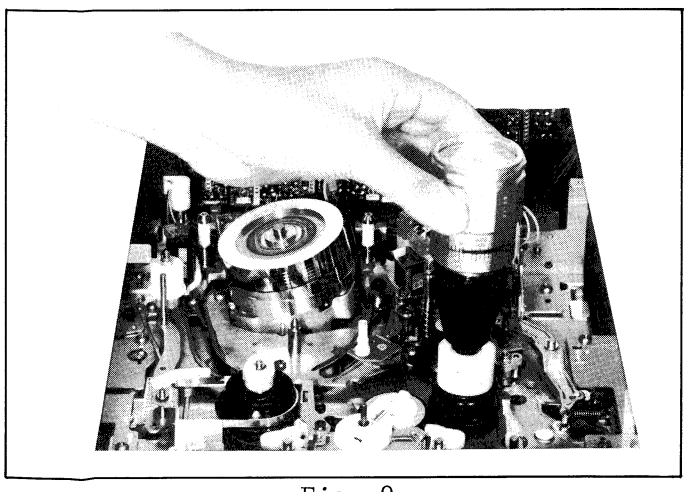


Fig. 9

NOTE:
While measuring, the weight of torque gauge should not rest on reel table.

1-6. ADJUSTMENT OF REVIEW TORQUE

* Equipment Required:
  Dial Gauge (VFK0133)
  Adaptor for Gauge (VFK0134)

* Specification:
  Review mode ... 200 ± 20g-cm

1. Remove the cassette compartment. Do not disconnect the connection cable from the Front Loading Motor.
2. Insert a cassette tape and attach the adaptor to the torque gauge.
3. Set a torque gauge to the Supply Reel Table, and then push the PLAY button and REW button for REVIEW mode. (If the unit enters the Auto-Stop mode, the take-up reel sensor functions. Manually keep rotating the take-up reel table while reading the torque gauge.)

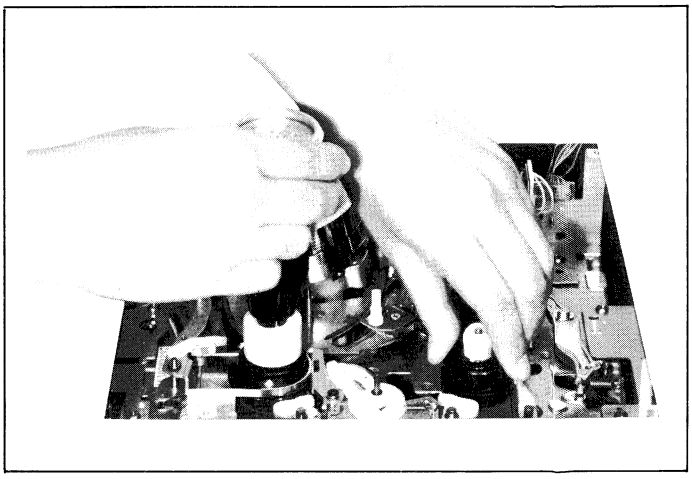


Fig. 10

4. Read a torque gauge.
5. If it is out of spec., change the spring notch.

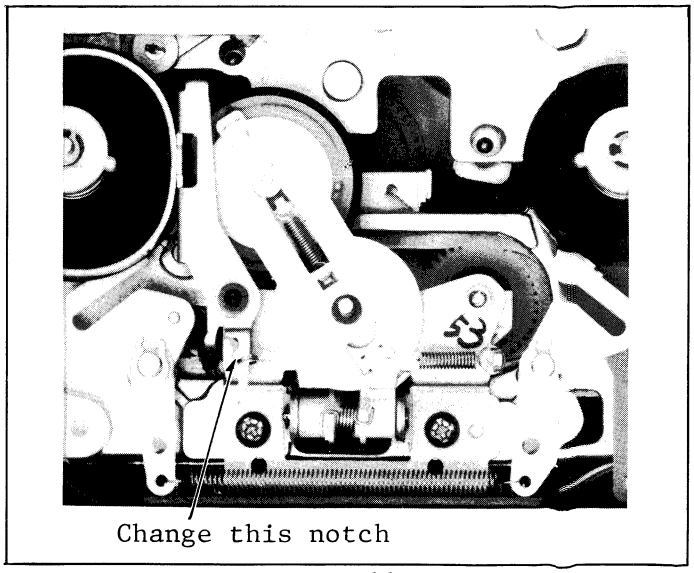


Fig. 11

1-7. MEASUREMENT AND ADJUSTMENT OF BACK TENSION

A. MEASUREMENT PROCEDURE

* Equipment Required:
  Back Tension Meter (Tentelometer)
  VHS Cassette Tape (120 minutes tape)

* Specification: 25 ∿ 30g

1. Pull the erase head in the direction indicated by the arrow and hold it by adhesive tape.
2. Play back the cassette tape from its beginning and wait until tape running has stabilized. (for approx. 10 ∿ 20 seconds)
3. Insert tension meter in the path and confirm reading.

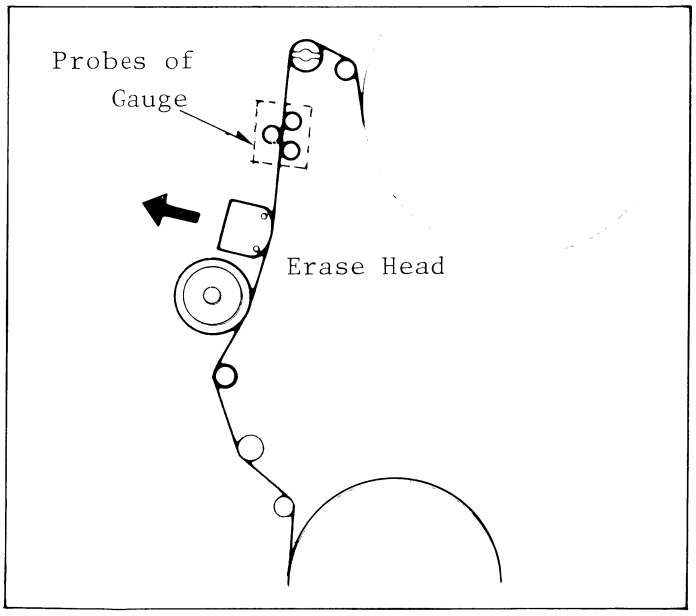


Fig. 12 Measurement of Back Tension

NOTE:
1. Make sure that the three probes of the meter are all in good contact with tape, but out of contact with supply inertia roller while measuring.
2. It is recommended to be measured three times as tension meter is very sensitive.

B. ADJUSTMENT PROCEDURE

* Equipment Required:
  Fine Adjustment Screwdriver
  (VFK0136)

1. Loosen a screw (A) and insert the fine adjustment screwdriver into the hole (B).
2. Move the adjustment driver in either of direction indicated by the arrow to obtain the specified tension. Turn the driver clockwise to raise tension, counterclockwise to lower it.
3. Tighten the screw (A), and set the Cassette Compartment. Verify the tension with the meter once again.

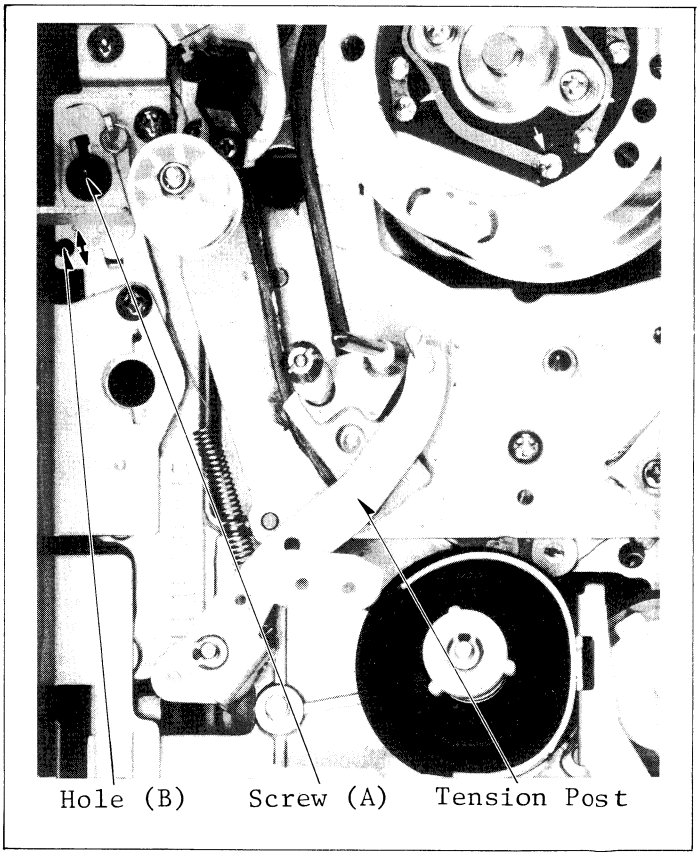


Fig. 13

4. After above the adjustment is completed, remove the adhesive tape.

1-8. HEIGHT ADJUSTMENT OF REEL TABLES

* Equipment Required:
  Post Adjustment Plate (VFK0191)
  Reel Table Height Fixture (VFK0190)

* Specification: 0 ∿ 0.2mm

1. Remove the cassette compartment.
2. Place the post adjustment plate, put the dial gauge on it and set the dial gauge to zero "0" with the condition that scraper of gauge touches the cut-out portion of the plate.

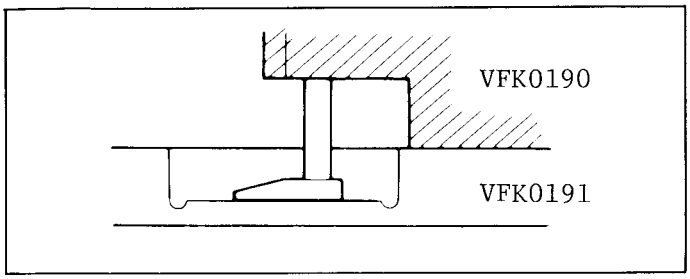


Fig. 14 Adjustment of Reel Table Height-(1)

3. Then measure the top portion of reel table and confirm the difference against the condition just performed in the former step. Also perform the same measurement and confirmation for other reel table.

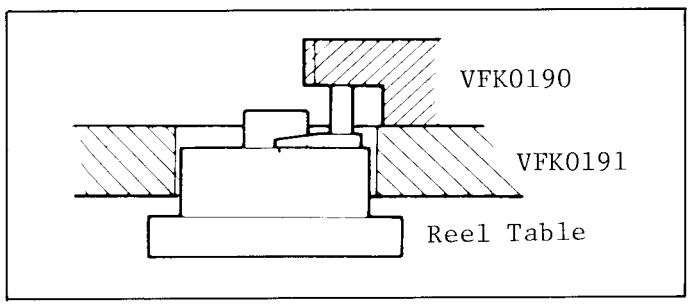


Fig. 15 Adjustment of Reel Table Height-(2)

4. If the difference is more than 0.1mm (high or lower), adjust the height of reel table to obtain the specified height.
5. For the adjustment, change the poly-slider washer located under the reel table. The washers of following thicknesses are available.

Washer / Thickness	Part No.
0.13mm	XWXV3Z6
0.25mm	XWXV3A6
0.5mm	XWXV3D6

Fig. 16

1-9. HEIGHT ADJUSTMENT OF TAPE GUIDE POST

* Equipment Required:
  - Hex. Wrench, (0.9mm) (VFK0146)
  - Post Adjustment Plate (VFK0191)
  - Reel Table Height Fixture (VFK0190)
  - Nut Driver (Purchase locally)
  - Post Adjustment Screwdriver (VFK0137)

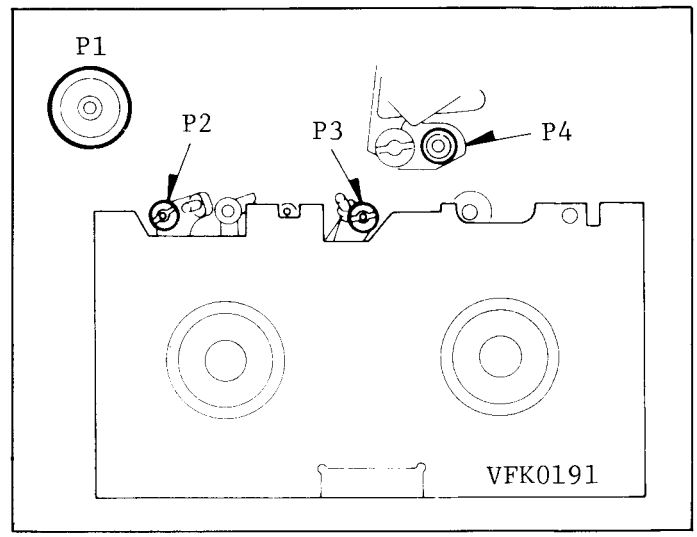


Fig. 17

1. First loosen a hex. screw located lower portion of posts (P2 & P3), and turn the posts so the condition of height becomes as shown below. (Lower edge of post, tape guide should be lower than scraper.)

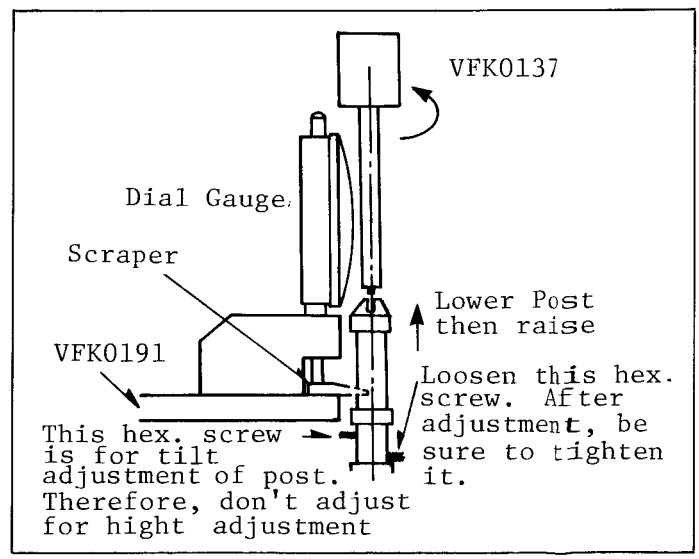

VFK0137
Dial Gauge
Scraper
Lower Post then raise
VFK0191
Loosen this hex. screw. After adjustment, be sure to tighten it.
This hex. screw is for tilt adjustment of post. Therefore, don't adjust for hight adjustment

Fig. 18

2. Place the dial gauge on the adjustment plate and set the dial gauge to zero"0".
3. Take the scraper to the post and slowly raise the post until just the post is raised to touch the scraper.

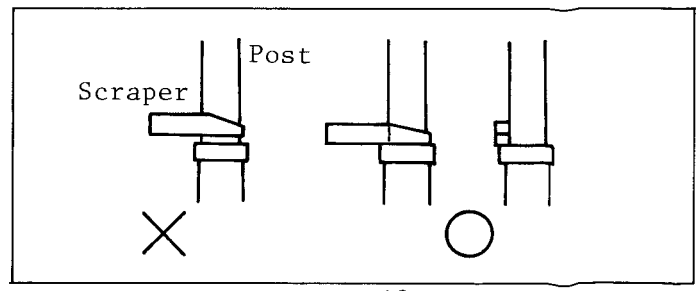


Fig. 19

4. To adjust P1 and P4, use the nut driver.
5. After above adjustment is completed, tighten hex. screws on the P2 and P3 post.

1-10. HEIGHT ADJUSTMENT OF PULL OUT POST

NOTES:

1. The adjustment should be performed after the adjustment of P4 as the spec. is based on height of P4.
2. The adjustment should be performed in the loading completion mode.
3. Unless the replacement or adjustment of this post is required, the adjustment nut should not be turned.

* Equipment Required:
  Post Adjustment Plate (VFK0191)
  Reel Table Height Fixture (VFK0190)
  Nut Driver (Purchase Locally)

* Specification: 0.01 ± 0.01mm

1. Remove the cassette compartment. Do not disconnect the connection cable from the Front Loading Motor.
2. Insert a cassette tape into the cassette compartment, and push the PLAY button for loading.
   As soon as the loading is completed, take out the AC plug.
3. Place the adjustment plate, put the height fixture on the plate and set dial gauge to zero "0" with condition the scraper touches on the plate.

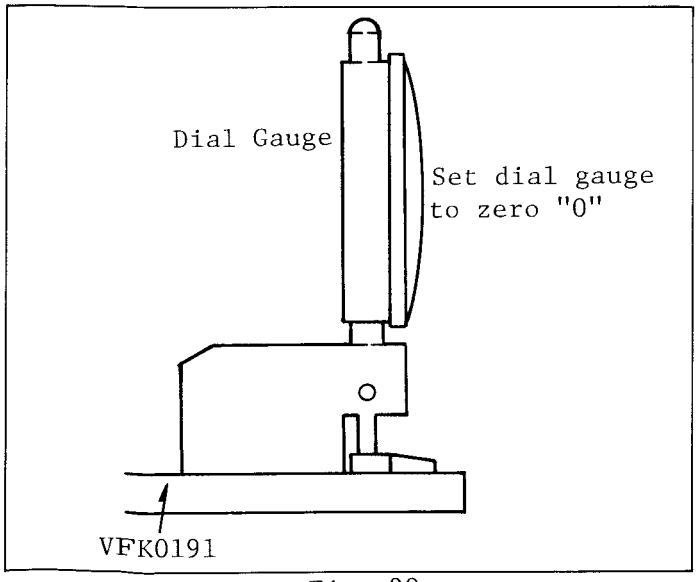


Fig. 20

4. First, slightly lower the post by turning the nut clockwise. Fit the scraper to the post so the condition becomes as shown.

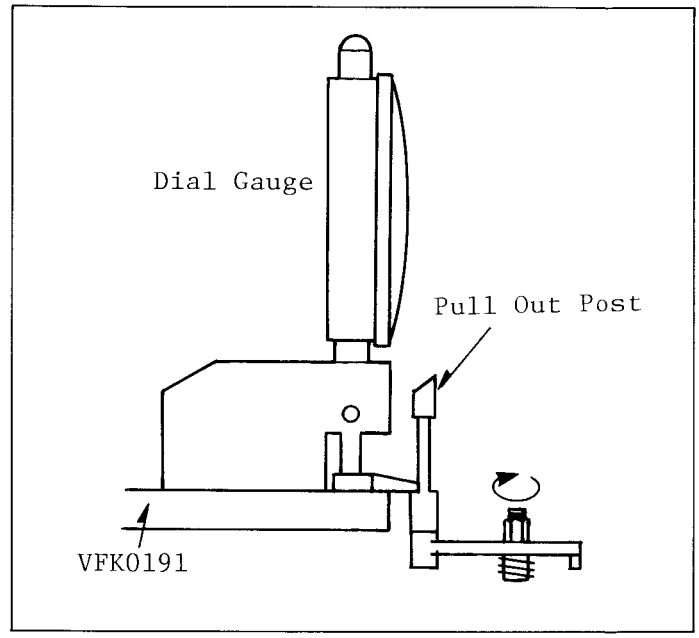


Fig. 21

5. Then slowly and slightly turn the nut till the gauge read specified as shown below.

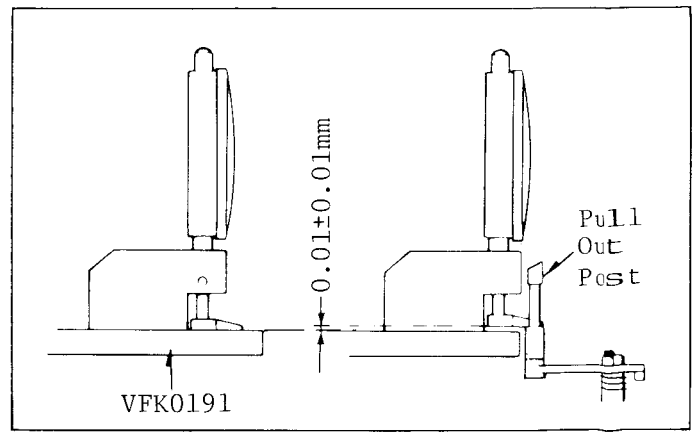


Fig. 22

6. After the adjustment, connect the AC plug for unloading.
7. Reinstall the cassette compartment.
8. Play back a normal cassette tape and make sure that the edges of the tape are not curling against the edge of the posts P1, P2, P3, P4 and pull out post as shown in Fig. 23.

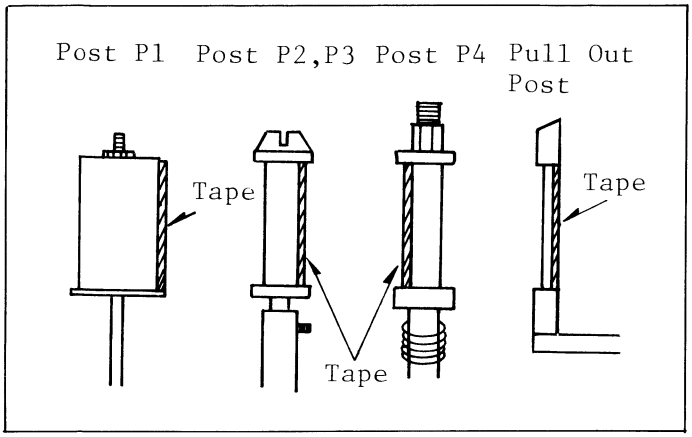


Fig. 23

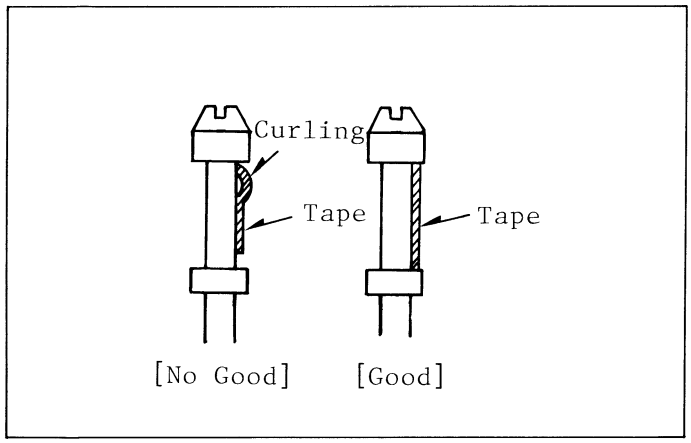


Fig. 24

9. If curling appears, readjusts each post.

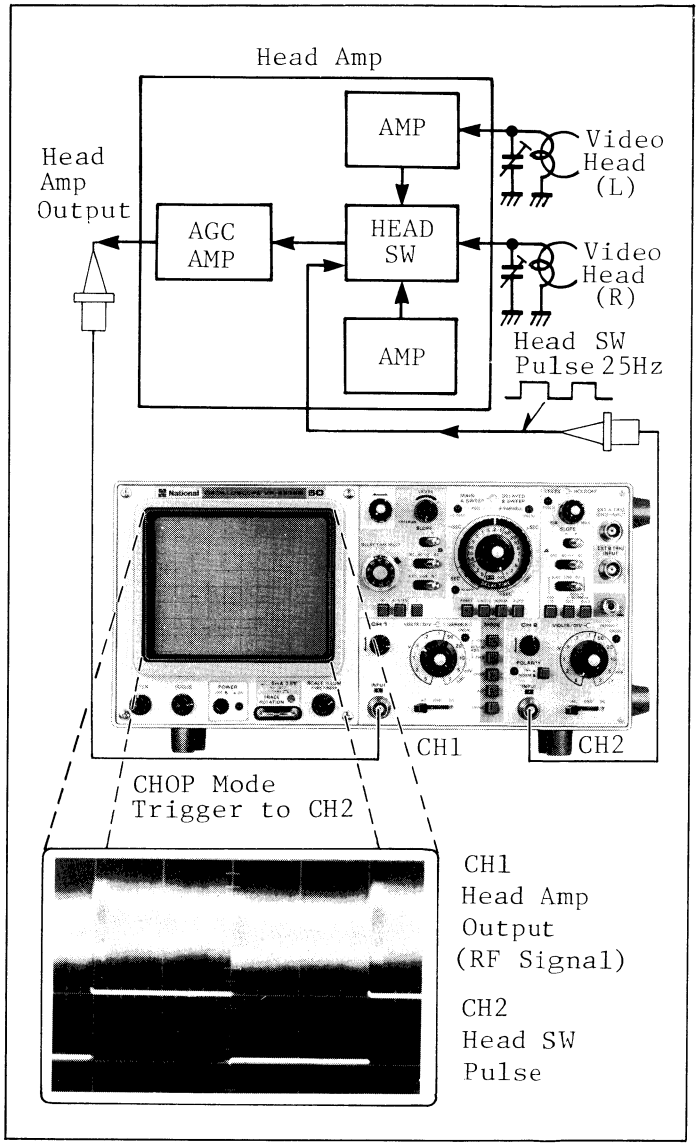


Fig. 25 Connection of Oscilloscope

1-11. TAPE INTERCHANGEABILITY ADJUSTMENT

* Equipment Required:
  Alignment Tape (VFM8100H3D)
  Post Adjustment Screwdriver (VFK0137)

1. Set the tracking control into the detent (fixed) position.
   And connect the oscilloscope to the output of the Head Amp as shown below.

NOTE:
Head Amp output and the head switching pulse input for triggering the oscilloscope are shown in the Luminance Process Block Diagram of the VTR Service Manual.

2. Play back the alignment tape VFM8100H3D, adjust posts P2 and P3 by watching the scope display so the RF envelope on the scope becomes as flat as possible.
   (V1/V-max. $\geqq$ 0.7, V2/V-max. $\geqq$ 0.8)

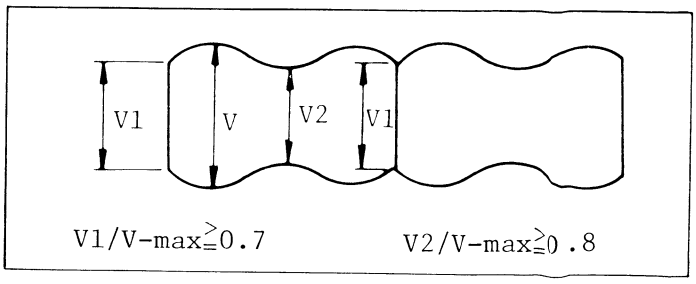


Fig. 26

3. When the scope display is as follows, adjust the height of P2 as shown below.

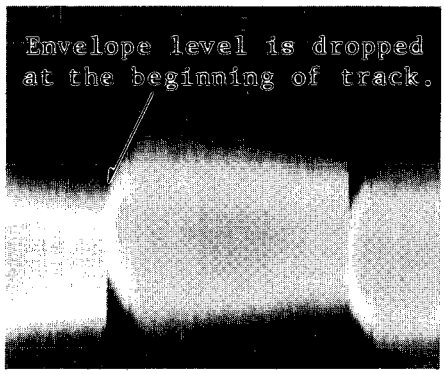


Fig. 27

4. When the scope display is as follows, adjust the height of P3 shown below.

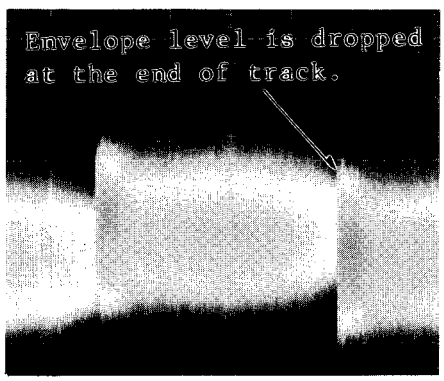


Fig. 28

5. The scope display with P2 and P3 adjusted correctly should become as shown below.

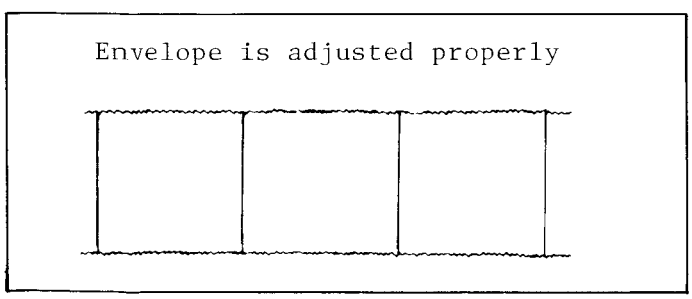


Fig. 29

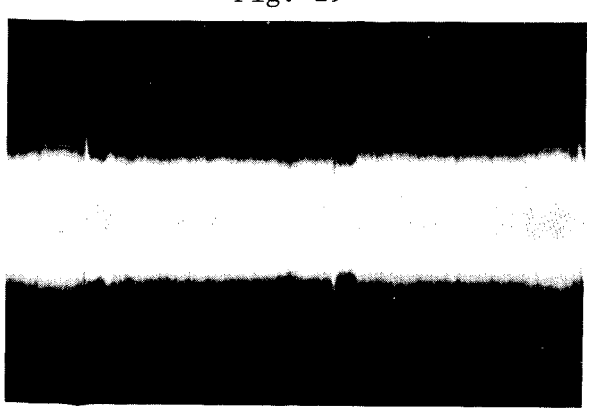


Fig. 30

1-12. CONFIRMATION/ADJUSTMENT OF A/C HEAD HEIGHT

A. CONFIRMATION PROCEDURE

1. Looking at the lower edge of the control head with the tape running, ensure the lower edge of tape runs along the lower edge of the control head.

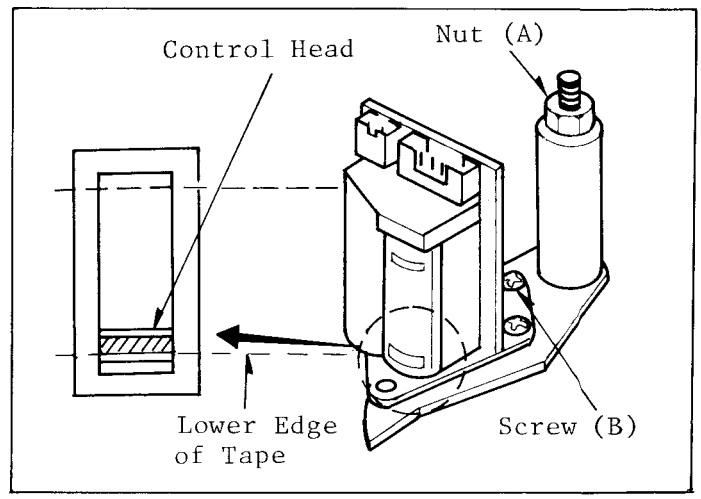


Fig. 31

B. ADJUSTMENT PROCEDURE

1. Slightly turn the nut (A) in either directions to correct it. Turn clockwise to lower the head and counterclockwise to raise it.

NOTE:
Unless the A/C Head is replaced, this adjustment should not be done.

1-13. TILT ADJUSTMENT OF A/C HEAD

A. Pre-adjustment Procedure

1. Playback a tape and confirm the tape runs between lower and top limiters of the post P4. If the lower edge or top edge of the tape turns with waving or frilling, then correct the tilt of the A/C head by turning black screw (B) shown in Fig. 31.

NOTE:
Unless the post P4 is pre-adjusted, this pre-adjustment procedure should not be done. (Refer to the section of "Height Adjustment of Tape Guide Posts".

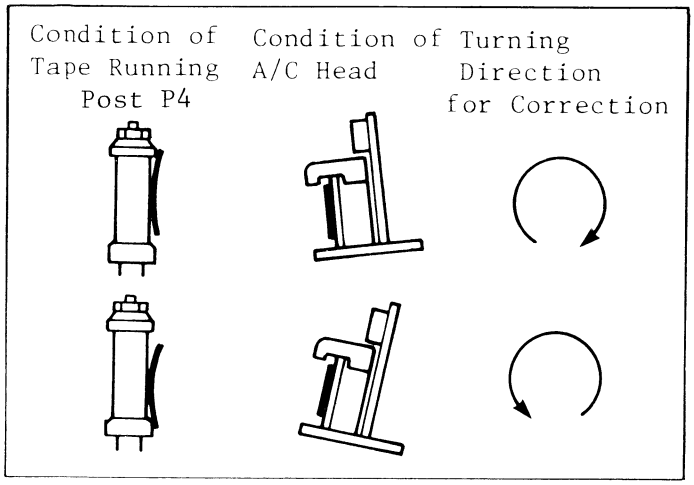


Fig. 32 Tilt Pre-Adjustment

1-14. AUDIO AZIMUTH ADJUSTMENT

* Equipment Required:
  VHS Alignment Tape (VFM8100H3D)

1. Connect the oscilloscope to the audio output on the rear of the deck.
2. Playback the alignment tape (6kHz, Audio) VFM8100H3D.
3. Adjust black screw (C) without spring on the head base so the output level become maximum.

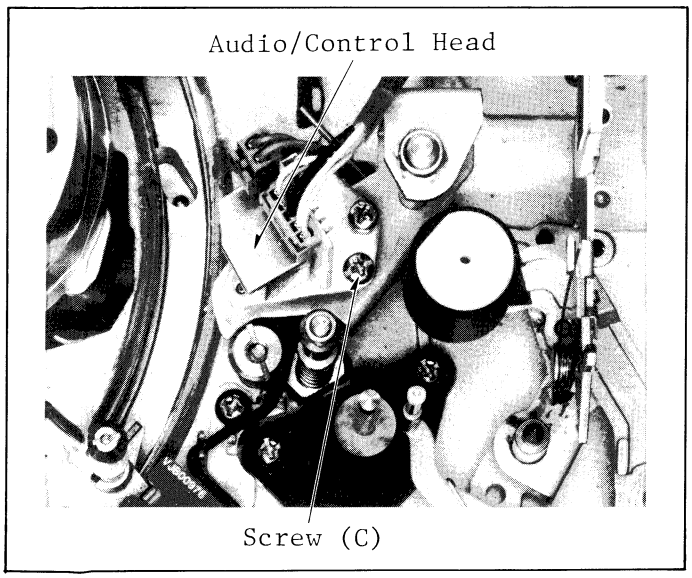


Fig. 33

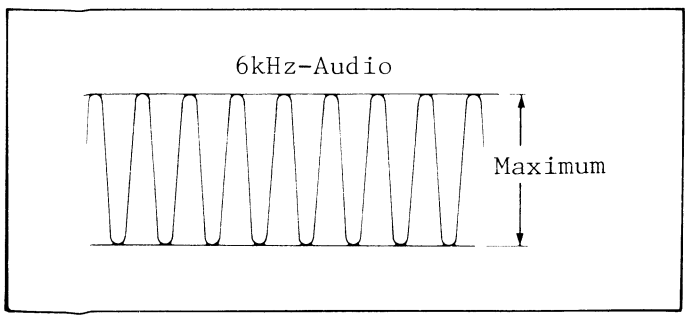


Fig. 34

1-15. HORIZONTAL POSITION ADJUSTMENT OF A/C HEAD

* Equipment Required:
  H-Position Adjustment Screwdriver (VFK0189)

1. Set the tracking control into the detent (fixed) position, and connect the oscilloscope to the output of the Head Amp. Refer to Fig. 25 "connection of oscilloscope".
2. Play back the alignment tape VFM8100H3D and confirm the RF envelope.
3. If the adjustment is required, set the H-position adjustment screwdriver into the slot of the adjustment nut and rotate in either of direction to obtain maximum envelope output.

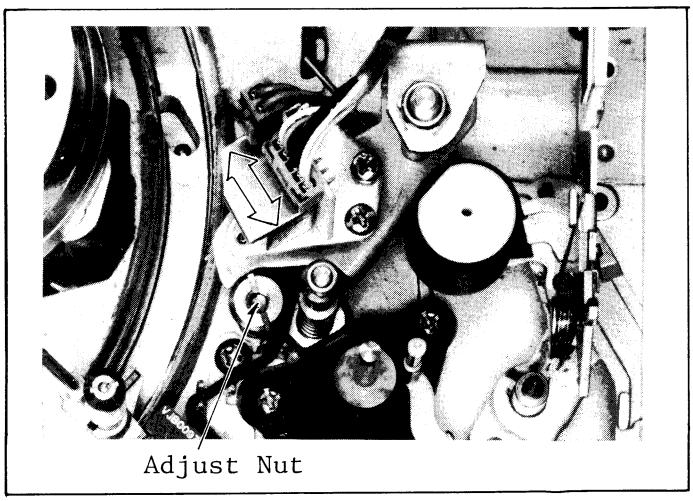


Fig. 35

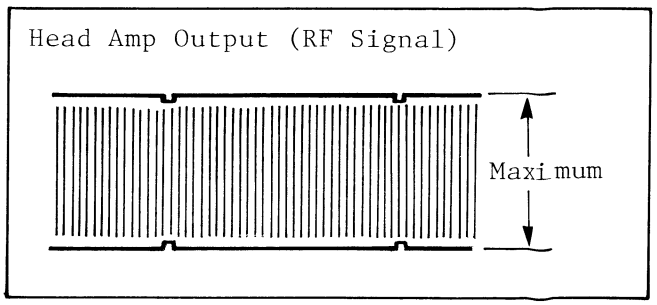


Fig. 36

1-16. ADJUSTMENT OF FG HEAD GAP

* Equipment Required:
  Fine adjustment Screwdriver
  (VFK0136)

* Specification: 0.12 ± 0.02mm

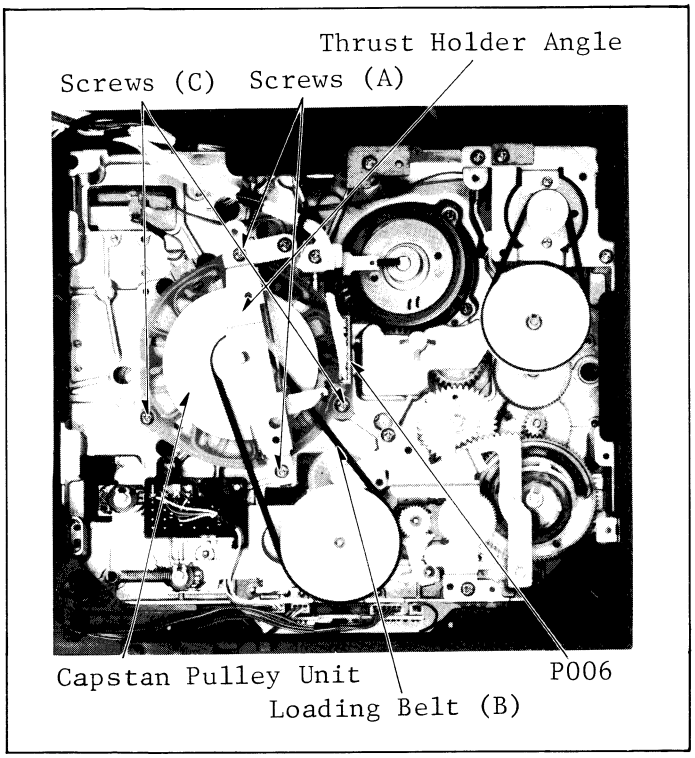


Fig. 37

1. Remove 2 screws (A) and thrust holder unit, the remove the loading belt (B) and the P006 connector.
2. Remove the capstan pulley unit and 2 screws (C), then remove the stator unit.

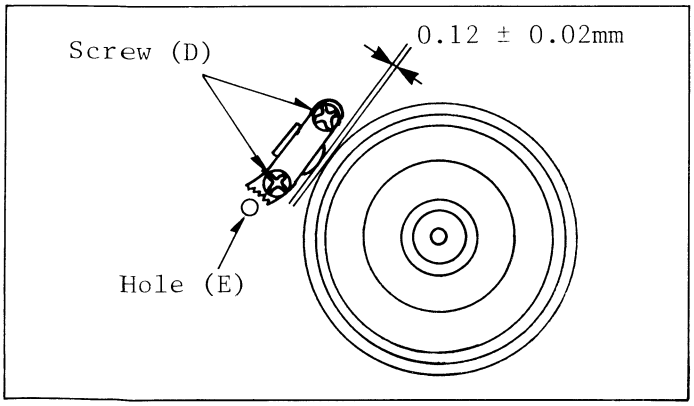


Fig. 38 Adjustment of F.G. Head Gap

3. Slightly loosen the 2 screws (D) and set the fine adjustment screwdriver in the hole (E).

NOTE:
1. Instead of this method, the cover page of this volume can be alternative because the thickness is approx. 0.12mm.
2. Do not touch the circumferential surface of roter with any tool, and keep any magnetizable material away from the roter magnet.
3. When reinstalling the capstan pulley unit, fit the roter unit to boss of capstan pulley unit.

1-17. ADJUSTMENT OF THRUST GAP

* Equipment Required:
  Reel Table Height Gauge (VFK0190)
  Washer (more than 1mm)

* Specification: 0.01 ∿ 0.10mm

1. Set the washer on the capstan pulley unit and place the height gauge on the thrust holder angle, and set the gauge to zero"0".
2. Next, push the capstan shaft by your finger.
3. If the gap is out of specification, then adjust the thrust boss by turning it clockwise or counterclockwise.

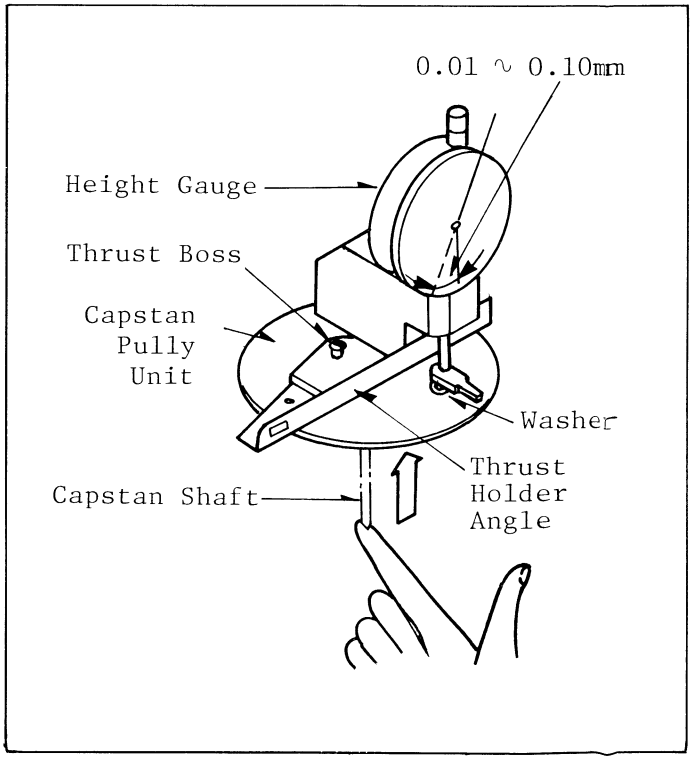


Fig. 39 Confirmation/Adjustment of Thrust Gap

1-18. ADJUSTMENT OF CAM GEAR AND MODE SELECT SWITCH

GENERAL CONDITION:

The mechanism of this model is mostly engaged to the electrical circuit, System Control Circuit, through the mode select switch. Therefore the relation between the mode switch and the cam gear decides all further mechanical movement of the mechanical parts such as levers gears, rollers and so on.
If the adjustment of this item is performed improperly, the deck will be unloaded or compulsorily stopped. And it will result being damaged at any mechanical or electrical parts.

A. ADJUSTMENT PROCEDURES OF CAM GEAR

1. Turn Loading gear clockwise until the P2 and P3 post were fully unloaded .
   The small projection on the loading gear will be top portion under the condition or Unloading Completion.

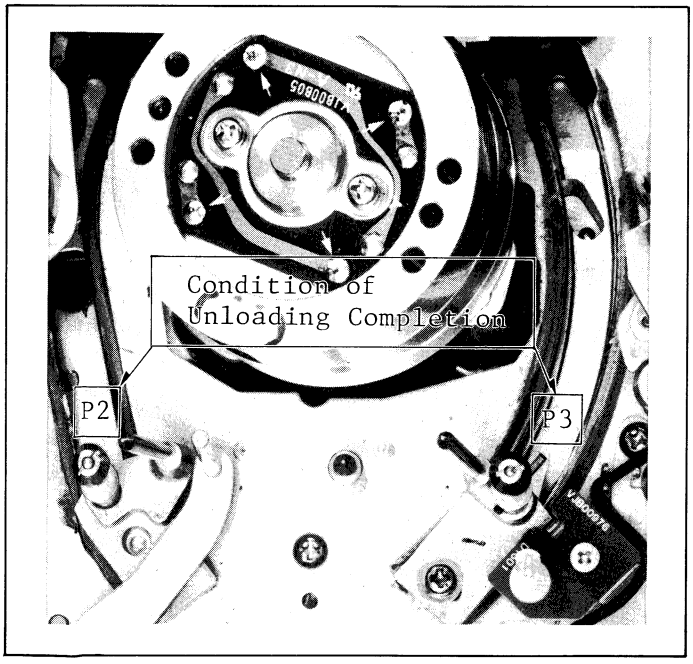


Fig. 40

2. Install the action gear so the hole on the action gear meets the projection on the loading gear. Ensure that the loading gear is still in the condition of the unloading completion.

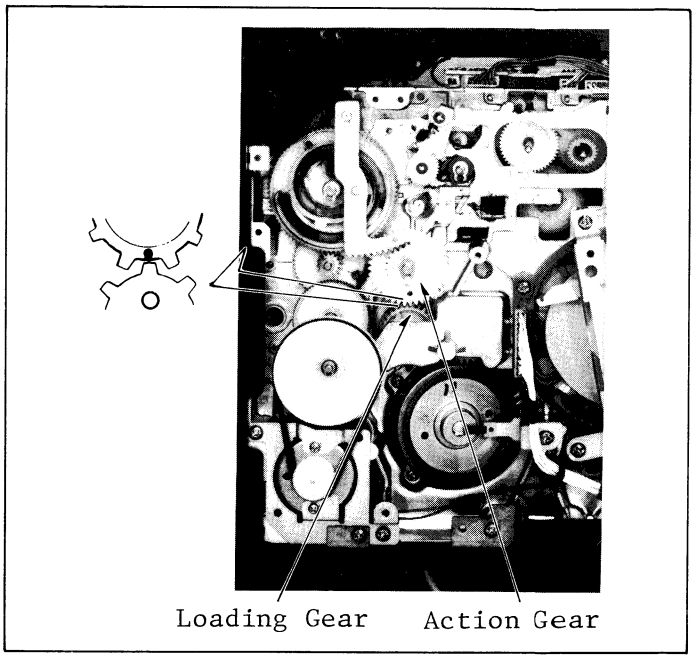


Fig. 41

3. Slowly slide the main rod so the V-shaped mark meet the V-shaped mark of the mode select switch. With the result, main rod and mode select switch are in a position to be stop (unloading completion) mode.
4. Insert the cam gear so the hole (A) on the gear meets the hole on the main rod. To meet the two holes easier, use the small hex. wrench (VFK75) or metal pin.
   Also ensure the two V-shaped marks are fixed.

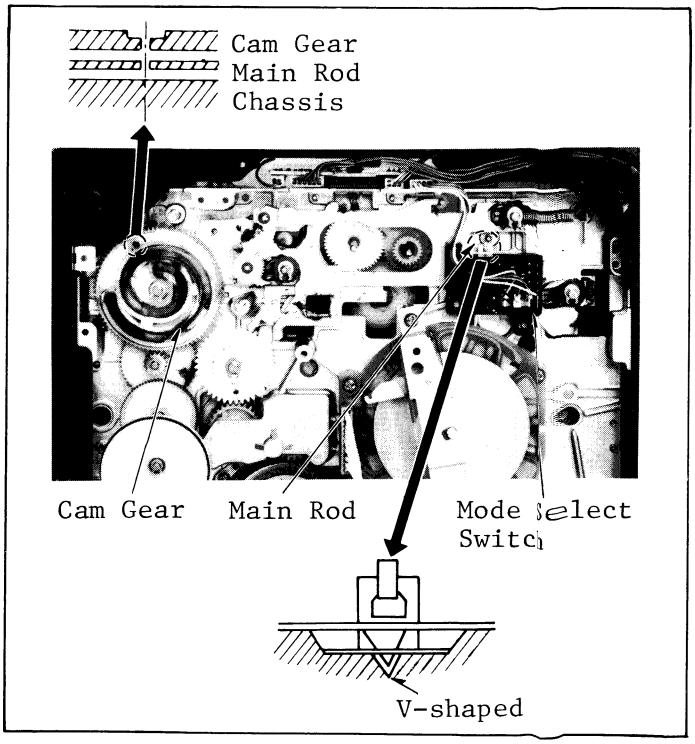


Fig. 42

5. Install the sector gear so the pin on the sector gear meets the inner slot of the cam gear (simple slot side). and install 2 retaining rings to mount cam gear and sector gear.
6. Final figure should become as shown below, and at the same time two V-shaped marks are fixed at the mode select switch.

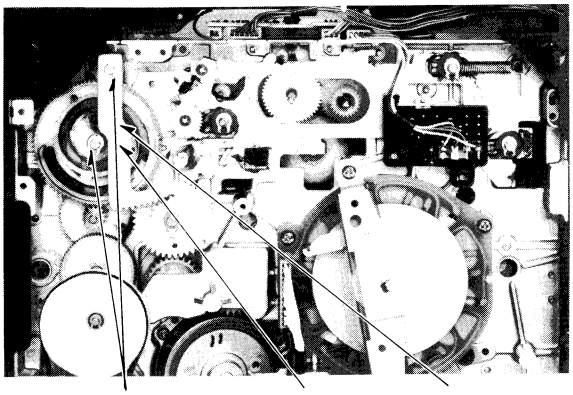


Fig. 43

7. Pull the arm lever unit to the counterclockwise, then install the kick base unit on the chassis and tighten 2 screws (A).
8. Pull the gear (B) to the clockwise, then install the clutch gear unit to the post.

NOTE:
When, install the clutch gear unit, match the hexagonformat the lower part.

9. Install the intermediate gear (C) to the other post with match the slit on it and install the cut washer to mount it.
10. Install the clutch pulley on the clutch gear unit, then install the capstan belt.
11. Turn the clutch pulley in both direction to confirm the smoot-movement of this mechanism.

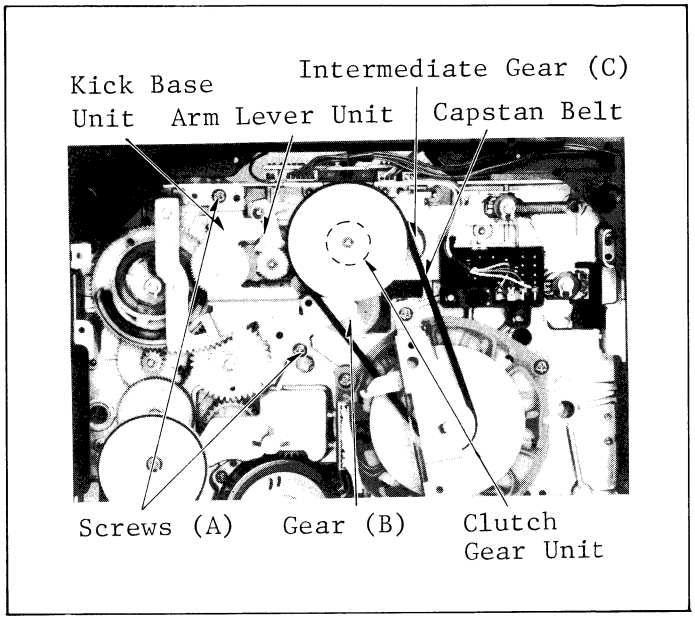


Fig. 44

B. ADJUSTMENT PROCEDURE OF MODE SELECT SWITCH

1. Fix the main rod in the condition of unloading completion.
2. Slightly loosen a screw (B).
3. Adjust the position of the mode select switch so that the two V-shaped marks of the mode select switch just correspond at the same position. Then tighten a screw (B).
4. Make sure that the movement of the unit is in normal condition.

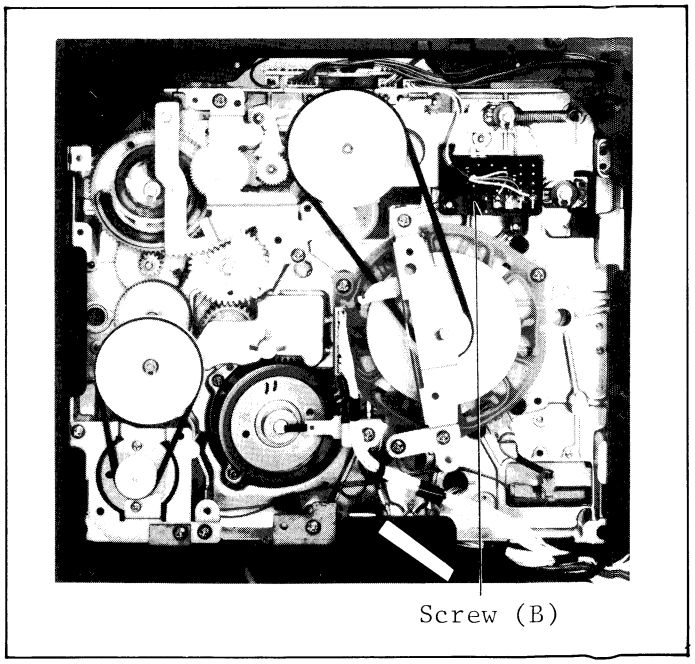
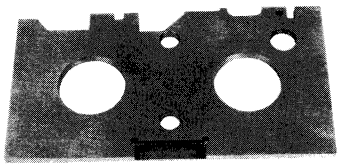


Fig. 45

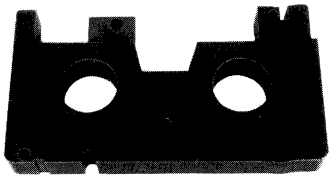
Servicing Fixtures & Tools

VFM8100H3D VHS Alignment Tape

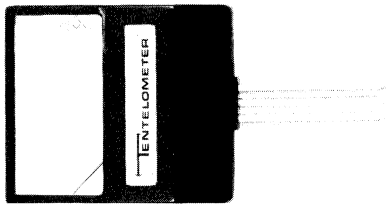
VFK0191 Post Adjustment Plate



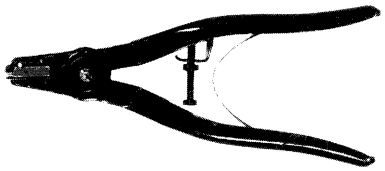
VFK0188 Cassette Holder Fixture



Back Tension Meter
(Tentelometer, Made in U.S.A.)

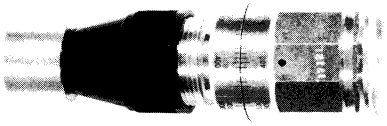


VFK0144 Retaining Ring Remover (3mm)
VFK0145 Retaining Ring Remover (4mm)

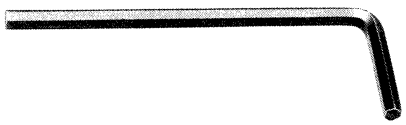


VFK0189 H-Position Adj. Fixture

VFK0133 Dial Torque Gauge
VFK0134 Adaptor for VFK0133
VFK0180 (Plastic Clamper Only)



VFK0146 Hex. Wrench (0.9mm)
VFK75 Hex. Wrench (1.25mm)
VFK76 Hex. Wrench (1.5mm)

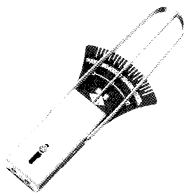


VFK0190 Reel Table Height Jig

VFK0135 Eccentric Screwdriver

VFK0225 Head Tester

VFK66 Fan Type Tension Gauge



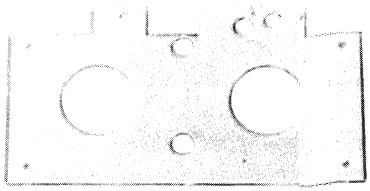
VFK0136 Fine Adjustment Screwdriver

Approx.
1.5mm.

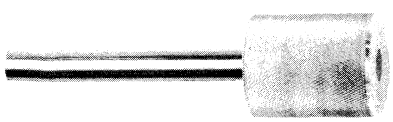
Grind the top portion
approximately 2.5mm.

VFK0185 Cleaning Cassette Tape

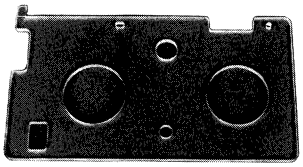
VFK0141 Capstan Reference Plate



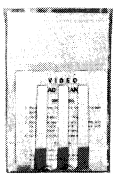
VFK0137 Post Adjustment Screwdriver



VFK0187 Tension Post Adj. Fixture



VFK27
Head Cleaning
Stick



MOR265 Morlytone Grease

National/Panasonic

MATSUSHITA ELECTRIC

Printed in Japan